CLAIMS

1. A peak power suppressing apparatus comprising:

a generation section that generates a multi-carrier signal in which data is superimposed on a plurality of carriers;

a conversion section that converts power of the generated multi-carrier signal with a non-linear function whereby an input value is mapped in a direction an absolute value becomes larger near the origin and the map of the input value gradually approaches a predetermined value as said map becomes distant from the origin; and

a transmission section that transmits the multi-carrier signal after the power conversion.

2. The peak power suppressing apparatus according to claim 1, wherein the conversion section converts the power of the multi-carrier signal with the non-linear function using an arctangent.

3. The peak power suppressing apparatus according to claim 2, wherein the conversion section converts power x of the multi-carrier signal to power y by equation:

$$y=a\cdot\tan^{-1}(b\cdot x)$$

where a and b are predetermined coefficients.

4. The peak power suppressing apparatus according to

claim 2, wherein the conversion section comprises:

a coefficient storage section that stores a coefficient of the non-linear function; and

an arctangent calculation section that performs an arctangent calculation with the power of the multi-carrier signal using the stored coefficient.

5. The peak power suppressing apparatus according to claim 2, wherein the conversion section comprises:

a parameter acquisition section that acquires a parameter providing an indicator of communication environment;

a coefficient determination section that determines the coefficient of the non-linear function based on the acquired parameter; andan arctangent calculation section that performs an arctangent calculation with the power of the multi-carrier signal using the determined coefficient.

6. The peak power suppressing apparatus according to claim 5, wherein the parameter acquisition section acquires at least one parameter from: power amplifier characteristics of the peak power suppressing apparatus; and the number of multiplexed codes, modulation level, or coding rate of the multi-carrier signal.

7. The peak power suppressing apparatus according to

claim 1, wherein the conversion section converts the power of the multi-carrier signal after approximating the non-linear function with a linear function.

8. A base station apparatus comprising the peak power suppressing apparatus of claim 1.

9. A mobile station apparatus comprising the peak power suppressing apparatus of claim 1.

10. A peak power suppression method comprising the steps of:

generating a multi-carrier signal in which data is superimposed on a plurality of carriers;

converting power of the generated multi-carrier signal with a non-linear function whereby an input value is mapped in a direction an absolute value becomes larger near the origin and the map of the input value gradually approaches a predetermined value as said map becomes distant from the origin; and

transmitting the multi-carrier signal after the power conversion.